TDW
AFS

PATENT
Atty. Docket:[MS-150] PHUS010093

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: ERIC COHEN-SOLAL ET AL.	Examiner: Dave Czekaj
Serial No.	: 09/819,971	Group Art Unit: 2613
Filed	: March 28, 2001	Confirmation No. 4223
For	: METHOD FOR ASSISTING AN AUTOMATED VIDEO TRACKING SYSTEM IN REAQUIRING A TARGET	

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
PO Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellant herewith respectfully presents its Brief on Appeal as follows:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant : ERIC COHEN-SOLAL ET AL. Examiner: Dave Czekaj

Serial No.: 09/819,971 Group Art Unit: 2613

Filed : March 28, 2001 Confirmation No. 4223

For : METHOD FOR ASSISTING AN AUTOMATED VIDEO TRACKING SYSTEM IN REAQUIRING A TARGET

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is an Appeal Brief in the above-identified patent application.

Please charge the fee of $500.00 as indicated on Form No. 2038.

Respectfully submitted,

Michael A. Scaturro
Reg. No. 51,356
Attorney for Applicant
(516) 414-2007

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited this date with the United States Postal Service as first-class mail in an envelope addressed to:

COMMISSIONER FOR PATENTS
PO Box 1450
Alexandria, VA 22313-1450

On April 29 2005
(Date of Mailing)

By
(Signature)

REAL PARTY IN INTEREST

The real party in interest is Koninklijke Philips Electronics N.V., a corporation of The Netherlands having an office and a place of business at Groenewoudseweg 1, Eindhoven, Netherlands 5621 BA. Koninklijke Philips Electronics N.V. is the parent company of the assignee of record U.S. Philips Corporation, a Delaware corporation having an office and a place of business at 345 Scarborough Road, Briarcliff Manor, New York, 10510-8001.

RELATED APPEALS AND INTERFERENCES

To the best of Appellants' knowledge and belief, there are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-6 and 8-21 are pending in this application. Claims 1-6 and 8-21 are rejected in the Final Office Action that mailed December 29, 2004. This rejection was upheld in an Advisory Action that mailed March 23, 2005. Claims 1-6 and 8-21 are the subject of this appeal.

STATUS OF AMENDMENTS

An Amendment After Final Action was filed February 9, 2005 in response to the Final Office Action. The Advisory Action upheld the rejection in response to that amendment. This Appeal Brief is in response to the Final Office Action that rejected Claims 1-6 and 8-21 and the Advisory Action that upheld that rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention, for example as claimed in independent Claims 1, 8 and 15, relates to a method, apparatus and system, respectively, for reacquiring a target in a video tracking system.

The video tracking system shown in Fig. 1 of U.S. Patent Application Serial No. 09/819,971 includes a camera 102 for providing video image data of a scene having a desired target 106 to be tracked. The system further includes a display 110a for displaying the video image data of the scene 104 from the camera 102. An input device (e.g., joystick) is used to select a desired target image 106. After selecting a desired target 106a, the automated video tracking system is switched to an automatic mode to initiate a tracking sequence to automatically track the selected desired target 106a. The tracking system 116 generates a model of a target 106a to be tracked that can be used to locate the target 106a in successive frames of the video image data. Once a model of the target 106a is generated, a controller 118 is then instructed by the automated tracking system 116 to move the camera 102 (via PZT motors 108) to keep the selected target 106 centered in the field of view of the camera 102. For example, see par. 27 of U.S. Patent Application Serial No. 09/819,971. The controller 118 determines the amount of camera movement necessary to keep the target 106 centered in the field of view of the camera 102. If the video tracking system has encountered a period of difficulty and has lost the selected target 106a or may be in jeopardy of losing the selected target 106a. For example, see par. 33 of U.S. Patent Application Serial No. 09/819,971. A period of difficulty may be characterized as a particular

situation which is difficult for the automatic video tracking system to resolve. For example, multiple people passing by the same location at the same time as the selected target, the operator may take over for the system for the time it takes for the target to pass the source of difficulty. It is noted that if no period of difficulty is encountered, the automated video tracking system continues to automatically track the selected target until the method is terminated, the selected target 106a leaves the scene 104, or it is no longer desired to track the selected target 106a. If the operator perceives a difficulty has or is about to be encountered, the method proceeds by switching from automatic mode to manual mode. For example, see par. 33 of U.S. Patent Application Serial No. 09/819,971. Once in manual mode, the operator reacquires the desired target. It is preferred that the target is reacquired in a simpler manner as compared to the way it is initially selected, namely, by centering the desired target 106a in the monitor's display 110a of the scene 104 by manipulating the joystick 112 or other input device. For example, see par. 34 of U.S. Patent Application Serial No. 09/819,971. Once the target is reacquired, the automated video tracking system is switched back to the automatic mode at step 212 where the desired target is automatically tracked without initiating a new tracking sequence. It is important for the operator to quickly reacquire the desired target 106a so that a new tracking sequence is not initiated after the target 106a is reacquired and automatic tracking restarted. Preferably, automatic tracking restarts by either a manual instruction from the user, as discussed above, or preferably automatically by releasing control of the joystick 112 or other input device used to reacquire the desired target 106a. After switching back to automatic mode, the automatic video tracking system continues to

track the reacquired target 106a until the target leaves the scene, tracking of the reacquired target is no longer desired, or another area of difficulty is encountered by the automatic tracking system,.

The method includes the step of selecting a desired target 106a to be tracked. For example, see element 202 of FIG. 2 of U.S. Patent Application Serial No. 09/819,971. When the target 106a is selected, a computer model is built to represent the appearance of that target 106a. During tracking of the target 106a, whenever the tracker finds a part of the image that matches to the target model, it preferably computes a number which represents how well the target 106a matches the model. This number can vary for example from 0% match to 100% match. Where the 100% indicates that the target matches the model completely. This value is called the confidence value. A control can also be provided to indicate a threshold value for the confidence. See for example, the text at par. 36 of U.S. Patent Application Serial No. 09/819,971. The method further includes the step of switching the automated video tracking system to an automatic track mode to initiate a tracking sequence to automatically track the selected desired target. For example, see element 204 of FIG. 2 of U.S. Patent Application Serial No. 09/819,971. The method further includes the step of, during the automatic track mode, the automated video tracking system providing a warning to a user indicating that said automatic track mode is about to fail whenever the calculated confidence value falls below a pre-determined threshold confidence value. For example, see claim 7 of U.S. Patent Application Serial No. 09/819,971. The method further includes the step of switching the automated video tracking system from an automatic mode to a manual mode if the automated video

tracking system encounters a period of difficulty in tracking the tracked selected desired target. For example, see element 208 of FIG. 2 of U.S. Patent Application Serial No. 09/819,971. The method further includes the step of reacquiring the selected desired target in manual mode in response to and during said period of difficulty. For example, see element 210 of FIG. 2 of U.S. Patent Application Serial No. 09/819,971. The method further includes the step of switching back from the manual mode to the automatic mode without initiating a new tracking sequence. For example, see element 212 of FIG. 2 of U.S. Patent Application Serial No. 09/819,971.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether Claims 1-6, 8-9, 11, 13, 16 and 18 and 20 of U.S. Patent Application Serial No. 09/819,971 are obvious under 35 U.S.C. §103(a) over U.S. Patent No. 5,982,420 to Ratz ("Ratz") in view of U.S. Patent No. 5,867,584 to Hu ("Hu"). The Appellant respectfully wishes the Board to address the patentability of Claims 1, 8 and 15 and further Claims 2-6, 9-14 and 16-21, as depending thereon, based on the requirements of Claims 1, 8 and 15, respectively. This position is provided for the specific and stated purpose of simplifying the current issue on appeal. However, the Appellant herein specifically wishes to reserve the right to argue and address the patentability of each of the further claims at a later date should the separately patentable subject matter of those claims later become an issue. Accordingly, this limitation of the subject matter presented for appeal herein, specifically limited to discussions of the patentability of Claims 1, 8 and 15 is not intended as a waiver of Appellant's right to argue the patentability of the further claims and claim elements at that later time.

ARGUMENT

Claims 1-6, 8-9, 11, 13, 16 and 18 and 20 are said to be unpatentable over Ratz in view of Hu.

The Ratz Patent

Ratz shows a stand-alone video tracking device that is easily added to existing remotely controlled camera systems without extensive modification. See Ratz, Col. 1, lines 59-65. The automatic tracking device comprises means for generating steering signals that are applied to detecting circuits to cause the camera to track an object. See Ratz, Col. 2, lines 16-18.

An operator is shown a white rectangle box 28 as an operator prompt to inform the operator that the object 14 he/she is attempting to track has enough contrast for him/her to lock onto (see Ratz, Col. 12, lines 15-18). If any video image or image information related to object 14 is detected the counter is reset (see Ratz, Col. 12, lines 18-20). If two consecutive fields occur with no detectable object in the window, the white rectangle 28 is extinguished. As soon as video or image information related to the object 14 is detected again, the rectangular box 28 is illuminated (see Ratz, Col. 12, lines 24-25).

An operator initiates tracking with a manual override switch located on an operator console 20 (see Ratz, Col. 12, lines 33-34). A trigger switch on the joystick can be the source of a manual override signal 44. Steering signals are not accepted by the camera directing circuits unless the trigger is squeezed (i.e., manual mode). When

the trigger switch is released the camera is locked in that position (i.e., automatic mode) (see Ratz, Col. 12, line 40).

More particularly, the autotracker 18 of Ratz couples to an existing tracking device by intercepting the trigger switch command signal and connecting it to signal path 44, as shown in FIG. 7. If the autotracker 18 is not locked on a target the window will be frozen in the center of the display screen. When the trigger is released the autotracker 18 window 28 will begin following any object that was in the window 28 at the time the trigger is released (see Ratz, Col. 12, lines 54-55). When the trigger on a joystick 22 is squeezed, the manual override signal of the operator's console 20 allows an operator to slew the camera as normal (i.e., manual mode). This squeezing action will allow him/her to move an object 14 he/she wishes to track into the window. Releasing the trigger switch locks the autotracker 18 on the object 14.

If the autotracker 18 has successfully locked on a target the steering voltages will now come from the autotracker 18 instead of the operator. (see Ratz, Col. 12, lines 62-63). The autotracker 18 will disable itself if the object disappears. (see Ratz, Col. 13, line 1).

The Examiner's First Position

The Examiner maintains in the Final Office Action at page 4, that Ratz does show disengaging the autotracker if the object encounters a period of difficulty. See Ratz, Col. 13, lines 1-5 wherein it is stated:

"***The autotracker 18 will disable itself if the object disappears.*** *If 64 consecutive fields of data related to the object 14 occur with no video or image information (about one second) latch U12B is clocked low by counter U10 of FIG. 7, allowing the manual override 46 to return to logic zero and forcing the digital-to-analog converter outputs of FIG. 8 and FIG. 9 to zero volts with the presence of the HOME command.* " [Emphasis Added]

The Appellant's First Position

With regard to the Examiner's assertion that "...Ratz does show disengaging the autotracker if the object encounters a period of difficulty...". While Ratz may in fact show disengagement, the Examiner fails to appreciate the difference in the terms "disengagement" and "period of difficulty". As argued in the appellant's response filed on February 9, 2005, it was asserted that the specification teaches that a "period of difficulty", can be, for example, having the confidence value fall temporarily below a pre-defined threshold, as taught in step (d) of Claim 1. This is clearly distinguishable from the more permanent condition of "disengagement" or "disablement", as taught in Ratz at Col. 13, lines 1-5, wherein it is stated: *The autotracker 18 will disable itself if the object disappears."*

By contrast, as argued in the final Office Action, the invention is directed to a capability for re-acquiring a target in an automated video tracking system. Ratz only addresses the most extreme situation of an object disappearing. The invention is directed to the more common situation of a tracking system experiencing a temporary track loss or failure and providing a solution by temporarily switching from automatic to manual track mode, having an operator intervene in the manual mode to correct the temporary track loss and switching back from the manual to automatic track mode.

The method steps involve the construction of a computer model of a target 106 to be tracked to represent the appearance of a target 106a. During the tracking of the target 106a, whenever the tracker finds a part of the image that matches to the target model, it computes a number which represents how well the target 106a matches the model, i.e., a confidence value (see Claim 1, step (c)). A control can also be provided to indicate a threshold value for the confidence value. Thus, should the model match the target with less than this threshold value, the operator is preferably warned by a signal of some form that the confidence is lower than the threshold and the tracking is about to fail (see Claim 1, step (d)). In such a situation, the operator may take over for the system for the time it takes for the target to pass the source of difficulty by reacquiring the target, after which control is given back to the automatic tracking system (see Claim 1, step (e)).

As argued in the final office action, the period of difficulty in tracking the target automatically is a temporary state that is overcome by operator intervention, i.e., switching from an automatic to a manual mode. This is clearly distinguishable from the autotracker disabling itself if the object disappears, as disclosed in Ratz at Col. 13, lines 1-5.

In a phone conversation with the Examiner on April 26, 2005, the appellant proposed to amend step (e) of Claim 1 to more clearly recite the fact that the period of difficulty is a "temporary" state. In particular, the appellant proposed the following amendment to step (e) of claim 1:

...(e) switching the automated video tracking system from an automatic mode to a manual mode if the automated video tracking system encounters a temporary period of difficulty in tracking the tracked selected desired target,...

The Examiner discussed this proposal with his supervisor and concluded that Ratz allegedly teaches step (e) at Col. 12, lines 15-27. The Appellant did not have an opportunity to discuss the Examiner's conclusion. The Appelant respectfully points out, , however, that upon a close reading of Col. 12, lines 15-27 that Ratz does not in fact teach a so-called "temporary disablement". Instead, Col. 12, lines 15-27 teaches the case where an operator has yet to lock onto a target. This is clearly distinguishable from the method taught in independent Claims 1, 8 and 15, where an object is already being tracked in automatic mode and must be temporarily switched to manual mode to overcome a temporary period of difficulty.

The Examiner's Second Position

The Examiner maintains in the Final Office Action at page 4, that Hu discloses "during the automatic track mode, the automated video tracking system calculates a confidence value indicating a degree of correlation between the tracked target and a previously constructed computer model. The Examiner cites Hu at Col. 3, lines 35-40, wherein the confidence value is the quality and at Col. 4, lines 1-4, wherein the previously constructed computer model is the file from which the user has to open to begin the tracking procedure.

The Appellant's Second Position

With regard to the Examiner's assertion that Hu discloses "during the automatic track mode, the automated video tracking system calculates a confidence value indicating a degree of correlation between the tracked target and a previously constructed computer model ".

In accordance with the principles of the invention, as disclosed at par. 36 of U.S. Patent Application Serial No. 09/819,971, when the target 106a is initially selected, a computer model is built to represent the appearance of that target 106a. During tracking of the target 106a, whenever the tracker finds a part of the tracked video image that matches to the target model, it preferably computes a number which represents how well the target 106a matches the model.

In the Final Office Action, the Examiner maintains that the previously constructed computer model is the file from which the user has to open to begin the tracking procedure. Hu discloses at Col. 4, lines 1-10, that the user opens the video file to select an object the user wishes to track and defines an object window around the object and then selects the track button which instructs the system to automatically track the object in subsequent frames.

The system of Hu is directed to automatically tracking objects through a video sequence. For example, see Hu in the Abstract. The video sequence relates to interactive multimedia applications, interactive television and games. For example, see Hu at Col. 1, lines 6-10. Assuming that the previously constructed computer model is the file from which the user has to open to begin the tracking procedure, Hu cannot teach or disclose the comparison of a computer model with a tracked video

image of the target, as recited in the independent claims as amended because each frame of the opened file displays the computer model for purposes of tracking. That is, there is no teaching or disclosure in Hu of a comparison being made between the computer model displayed in each frame of the file with a tracked video target because in Hu, the tracked target is the computer model according to the Examinerr's interpretation. Hu only teaches that if the tracking system fails to track the object in a particular frame, the system will warn the user and wait for further instructions from the user. For example, see Hu at Col. 4, lines 14-17.

CONCLUSION

Claims 1-6 and 8-21are patentable over Ratz, alone or in view of Hu.

Thus the Examiner's rejection of Claims 1-6 and 8-21 should be reversed.

Respectfully submitted,

Michael A. Scaturro
Reg. No. 51,356
Attorney for Applicant

APPENDIX A

CLAIMS ON APPEAL

1. (Previously Amended) A method for reacquiring a target in an automated video tracking system, the method comprising the steps of:

(a) selecting a desired target to be tracked;

(b) switching the automated video tracking system to an automatic track mode to initiate a tracking sequence to automatically track the selected desired target;

(c) during said automatic track mode, the automated video tracking system calculating a confidence value indicating a degree of correlation between the tracked video image of the target and a previously constructed computer model of said tracked target;

(d) during said automatic track mode, the automated video tracking system providing a warning to a user indicating that said automatic track mode is about to fail whenever said calculated confidence value falls below a pre-determined threshold confidence value;

(e) switching the automated video tracking system from an automatic mode to a manual mode if the automated video tracking system encounters a period of difficulty in tracking the tracked selected desired target;

(f) reacquiring of the selected desired target in manual mode in response to and during said period of difficulty; and

(g) switching the automated video tracking system to the automatic mode for automatic tracking of the reaquired selected desired target without initiating a new tracking sequence.

2. (Original) The method of claim 1, wherein step (a) comprises centering the desired target in a display of a scene including the desired target.

3. (Original) The method of claim 1, wherein step (b) comprises releasing control of an input device used to select the desired target.

4. (Original) The method of claim 1, wherein step (c) comprises controlling an input device used to select the desired target.

5. (Original) The method of claim 1, wherein step (d) comprises centering the desired target in a display of a scene including the desired target.

6. (Original) The method of claim 1, wherein step (e) comprises releasing control of an input device used to reacquire the desired target.

7. (Cancelled)

8. (Previously Amended) An apparatus for reacquiring a target in an automated video tracking system, the apparatus comprising:

selecting means for selecting a desired target to be tracked;

mode switching means for switching the automated video tracking system to and from one of an automatic mode to initiate a tracking sequence after target selection to automatically track the selected desired target and a manual mode;

calculation means for calculating a confidence value indicating a degree of correlation between the video image of the tracked target and a previously constructed computer model of said tracked target;

warning means for providing a warning to a user indicating that said automatic track mode is about to fail whenever said calculated confidence value falls below a pre-determined threshold confidence value;

reacquiring means for reacquiring the desired target in manual mode in response to and during the automated video tracking system encountering a period of difficulty in tracking the desired target;

wherein after reacquiring the desired target the automated video tracking system is switched back to automatic mode without initiating a new tracking sequence.

9. (Original) The apparatus of claim 8, wherein the selecting means comprises an input device for centering the desired target in a display of a scene including the desired target.

10. (Original) The apparatus of claim 9, further comprising:

a video camera for capturing video image data of a scene including the desired target;

pan and tilt camera motors for controlling a pan and tilt, respectively of the video camera; and

a video display for displaying the video image data;

wherein the input device is a joystick operatively connected to the pan and tilt motors such that movement of the joystick controls the movement of the camera through the pan and tilt motors.

11. (Original) The apparatus of claim 8, wherein the mode selecting means comprises an input device where the automated video tracking system is switched to automatic mode by controlling an input device used to select the desired target and the automated video tracking system is switched to manual mode by releasing control of the input device.

12. (Original) The apparatus of claim 11, further comprising:

a video camera for capturing video image data of a scene including the desired target;

pan and tilt camera motors for controlling a pan and tilt, respectively of the video camera; and

a video display for displaying the video image data;

wherein the input device is a joystick operatively connected to the pan and tilt motors such that movement of the joystick controls the movement of the camera through the pan and tilt motors.

13. (Original) The apparatus of claim 8, wherein the reacquiring means comprises an input device for centering the desired target in a display of a scene including the desired target.

14. (Original) The apparatus of claim 13, further comprising:

a video camera for capturing video image data of a scene including the desired target;

pan and tilt camera motors for controlling a pan and tilt, respectively of the video camera; and

a video display for displaying the video image data;

wherein the input device is a joystick operatively connected to the pan and tilt motors such that movement of the joystick controls the movement of the camera through the pan and tilt motors.

15. (Previously Amended) An automated video tracking system for tracking and reacquiring a target, the automated video tracking system comprising:

a video camera for capturing video image data of a scene including a desired target;

pan and tilt camera motors for controlling a pan and tilt, respectively of the video camera;

a video display for displaying the video image data;

selecting means for selecting the desired target to be tracked;

mode switching means for switching the automated video tracking system to and from one of an automatic mode to initiate a tracking sequence after target selection to automatically track the selected desired target and a manual mode;

calculation means for calculating a confidence value indicating a degree of correlation between the video image of the tracked target and a previously constructed computer model of said tracked target;

warning means for providing a warning to a user indicating that said automatic track mode is about to fail whenever said calculated confidence value falls below a pre-determined threshold confidence value;

reacquiring means for reacquiring the desired target in manual mode in response to and during the automated video tracking system encountering a period of difficulty in tracking the desired target;

wherein after reacquiring the desired target the automated video tracking system is switched back to automatic mode without initiating a new tracking sequence.

16. (Original) The automated video tracking system of claim 15, wherein the selecting means comprises an input device for centering the desired target in the display.

17. (Original) The automated video tracking system of claim 16, wherein the input device is a joystick operatively connected to the pan and tilt motors such that movement of the joystick controls the movement of the camera through the pan and tilt motors.

18. (Original) The automated video tracking system of claim 15, wherein the mode selecting means comprises an input device where the automated video tracking system is switched to automatic mode by controlling an input device used to select the desired target and the automated video tracking system is switched to manual mode by releasing control of the input device.

19. (Original) The automated video tracking system of claim 18, wherein the input device is a joystick operatively connected to the pan and tilt motors such that movement of the joystick controls the movement of the camera through the pan and tilt motors.

20. (Original) The automated video tracking system of claim 15, wherein the reacquiring means comprises an input device for centering the desired target in a display of a scene including the desired target.

21. (Original) The automated video tracking system of claim 20, wherein the input device is a joystick operatively connected to the pan and tilt motors such that movement of the joystick controls the movement of the camera through the pan and tilt motors.

APPENDIX B

Evidence on Appeal

None

APPENDIX C

Related Proceedings on Appeal

None